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#5

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RAW SEQUENCE LISTING DATE: 12/06/2001
PATENT APPLICATION: US/09/902,188A TIME: 11:36:38

Input Set : N:\Crf3\RULE60\09902188A.txt
Output Set: N:\CRF3\12062001\I902188A.raw

SEQUENCE LISTING

(1) GENERAL INFORMATION:

(i) APPLICANT: Bisgard-Frantzen, Henrik
Svendsen, Allan
Borchert, Torben Vedel

ENTERED

(ii) TITLE OF INVENTION: AMYLASE VARIANTS

(iii) NUMBER OF SEQUENCES: 32

(iv) CORRESPONDENCE ADDRESS:
(A) ADDRESSEE: Novo Nordisk of North America, Inc.
(B) STREET: 405 Lexington Avenue, Suite 6400
(C) CITY: New York
(D) STATE: New York
(E) COUNTRY: U.S.A.
(F) ZIP: 10174-6401

(v) COMPUTER READABLE FORM:
(A) MEDIUM TYPE: Floppy disk
(B) COMPUTER: IBM PC compatible
(C) OPERATING SYSTEM: PC-DOS/MS-DOS
(D) SOFTWARE: PatentIn Release #1.0, Version #1.25 (EPO)

(vi) CURRENT APPLICATION DATA:
C--> **(A) APPLICATION NUMBER: US/09/902,188A**
C--> **(B) FILING DATE: 10-Jul-2001**
(C) CLASSIFICATION:

(vii) PRIOR APPLICATION DATA:
(A) APPLICATION NUMBER: 09/354,191
(B) FILING DATE:

(viii) ATTORNEY/AGENT INFORMATION:
(A) NAME: Lambiris, Elias J.
(B) REGISTRATION NUMBER: 33,728
(C) REFERENCE/DOCKET NUMBER: 4318.204-US

(ix) TELECOMMUNICATION INFORMATION:
(A) TELEPHONE: 212 867 0123
(B) TELEFAX: 212 867 0298

(2) INFORMATION FOR SEQ ID NO: 1:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 485 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 1:

```
His His Asn Gly Thr Asn Gly Thr Met Met Gln Tyr Phe Glu Trp Tyr
1               5                  10                  15

Leu Pro Asn Asp Gly Asn His Trp Asn Arg Leu Arg Asp Asp Ala Ala
            20                  25                  30

Asn Leu Lys Ser Lys Gly Ile Thr Ala Val Trp Ile Pro Pro Ala Trp
        35                  40                  45
```

RAW SEQUENCE LISTING DATE: 12/06/2001
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Input Set : N:\Crf3\RULE60\09902188A.txt
Output Set: N:\CRF3\12062001\I902188A.raw

```
Lys Gly Thr Ser Gln Asn Asp Val Gly Tyr Gly Ala Tyr Asp Leu Tyr
    50                  55                  60
Asp Leu Gly Glu Phe Asn Gln Lys Gly Thr Val Arg Thr Lys Tyr Gly
65                  70                  75                  80
Thr Arg Asn Gln Leu Gln Ala Ala Val Thr Ser Leu Lys Asn Asn Gly
                85                  90                  95
Ile Gln Val Tyr Gly Asp Val Val Met Asn His Lys Gly Gly Ala Asp
            100                 105                 110
Gly Thr Glu Ile Val Asn Ala Val Glu Val Asn Arg Ser Asn Arg Asn
        115                 120                 125
Gln Glu Thr Ser Gly Glu Tyr Ala Ile Glu Ala Trp Thr Lys Phe Asp
    130                 135                 140
Phe Pro Gly Arg Gly Asn Asn His Ser Ser Phe Lys Trp Arg Trp Tyr
145                 150                 155                 160
His Phe Asp Gly Thr Asp Trp Asp Gln Ser Arg Gln Leu Gln Asn Lys
                165                 170                 175
Ile Tyr Lys Phe Arg Gly Thr Gly Lys Ala Trp Asp Trp Glu Val Asp
            180                 185                 190
Thr Glu Asn Gly Asn Tyr Asp Tyr Leu Met Tyr Ala Asp Val Asp Met
        195                 200                 205
Asp His Pro Glu Val Ile His Glu Leu Arg Asn Trp Gly Val Trp Tyr
    210                 215                 220
 Thr Asn Thr Leu Asn Leu Asp Gly Phe Arg Ile Asp Ala Val Lys His
225                 230                 235                 240
 Ile Lys Tyr Ser Phe Thr Arg Asp Trp Leu Thr His Val Arg Asn Thr
                245                 250                 255
 Thr Gly Lys Pro Met Phe Ala Val Ala Glu Phe Trp Lys Asn Asp Leu
            260                 265                 270
 Gly Ala Ile Glu Asn Tyr Leu Asn Lys Thr Ser Trp Asn His Ser Val
        275                 280                 285
 Phe Asp Val Pro Leu His Tyr Asn Leu Tyr Asn Ala Ser Asn Ser Gly
    290                 295                 300
 Gly Tyr Tyr Asp Met Arg Asn Ile Leu Asn Gly Ser Val Val Gln Lys
305                 310                 315                 320
 His Pro Thr His Ala Val Thr Phe Val Asp Asn His Asp Ser Gln Pro
                325                 330                 335
 Gly Glu Ala Leu Glu Ser Phe Val Gln Gln Trp Phe Lys Pro Leu Ala
            340                 345                 350
 Tyr Ala Leu Val Leu Thr Arg Glu Gln Gly Tyr Pro Ser Val Phe Tyr
        355                 360                 365
 Gly Asp Tyr Tyr Gly Ile Pro Thr His Gly Val Pro Ala Met Lys Ser
    370                 375                 380
 Lys Ile Asp Pro Leu Leu Gln Ala Arg Gln Thr Phe Ala Tyr Gly Thr
385                 390                 395                 400
 Gln His Asp Tyr Phe Asp His His Asp Ile Ile Gly Trp Thr Arg Glu
                405                 410                 415
 Gly Asn Ser Ser His Pro Asn Ser Gly Leu Ala Thr Ile Met Ser Asp
            420                 425                 430
 Gly Pro Gly Gly Asn Lys Trp Met Tyr Val Gly Lys Asn Lys Ala Gly
```

RAW SEQUENCE LISTING DATE: 12/06/2001
PATENT APPLICATION: US/09/902,188A TIME: 11:36:38

Input Set : N:\Crf3\RULE60\09902188A.txt
Output Set: N:\CRF3\12062001\I902188A.raw

```
140              435                 440                 445
142      Gln Val Trp Arg Asp Ile Thr Gly Asn Arg Thr Gly Thr Val Thr Ile
143          450                 455                 460
145      Asn Ala Asp Gly Trp Gly Asn Phe Ser Val Asn Gly Gly Ser Val Ser
146      465                 470                 475                 480
148      Val Trp Val Lys Gln
149                      485
152 (2) INFORMATION FOR SEQ ID NO: 2:
154      (i) SEQUENCE CHARACTERISTICS:
155           (A) LENGTH: 485 amino acids
156           (B) TYPE: amino acid
157           (C) STRANDEDNESS: single
158           (D) TOPOLOGY: linear
160     (ii) MOLECULE TYPE: peptide
162     (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 2:
164      His His Asn Gly Thr Asn Gly Thr Met Met Gln Tyr Phe Glu Trp His
165      1               5                  10                  15
167      Leu Pro Asn Asp Gly Asn His Trp Asn Arg Leu Arg Asp Asp Ala Ser
168                  20                  25                  30
170      Asn Leu Arg Asn Arg Gly Ile Thr Ala Ile Trp Ile Pro Pro Ala Trp
171              35                  40                  45
173      Lys Gly Thr Ser Gln Asn Asp Val Gly Tyr Gly Ala Tyr Asp Leu Tyr
174          50                  55                  60
176      Asp Leu Gly Glu Phe Asn Gln Lys Gly Thr Val Arg Thr Lys Tyr Gly
177      65                  70                  75                  80
179      Thr Arg Ser Gln Leu Glu Ser Ala Ile His Ala Leu Lys Asn Asn Gly
180                      85                  90                  95
182      Val Gln Val Tyr Gly Asp Val Val Met Asn His Lys Gly Gly Ala Asp
183                  100                 105                 110
185      Ala Thr Glu Asn Val Leu Ala Val Glu Val Asn Pro Asn Asn Arg Asn
186              115                 120                 125
188      Gln Glu Ile Ser Gly Asp Tyr Thr Ile Glu Ala Trp Thr Lys Phe Asp
189          130                 135                 140
191      Phe Pro Gly Arg Gly Asn Thr Tyr Ser Asp Phe Lys Trp Arg Trp Tyr
192      145                 150                 155                 160
194      His Phe Asp Gly Val Asp Trp Asp Gln Ser Arg Gln Phe Gln Asn Arg
195                      165                 170                 175
197      Ile Tyr Lys Phe Arg Gly Asp Gly Lys Ala Trp Asp Trp Glu Val Asp
198                  180                 185                 190
200      Ser Glu Asn Gly Asn Tyr Asp Tyr Leu Met Tyr Ala Asp Val Asp Met
201              195                 200                 205
203      Asp His Pro Glu Val Val Asn Glu Leu Arg Arg Trp Gly Glu Trp Tyr
204          210                 215                 220
206      Thr Asn Thr Leu Asn Leu Asp Gly Phe Arg Ile Asp Ala Val Lys His
207      225                 230                 235                 240
209      Ile Lys Tyr Ser Phe Thr Arg Asp Trp Leu Thr His Val Arg Asn Ala
210                      245                 250                 255
212      Thr Gly Lys Glu Met Phe Ala Val Ala Glu Phe Trp Lys Asn Asp Leu
213                  260                 265                 270
```

```
215     Gly Ala Leu Glu Asn Tyr Leu Asn Lys Thr Asn Trp Asn His Ser Val
216              275                 280                 285
218     Phe Asp Val Pro Leu His Tyr Asn Leu Tyr Asn Ala Ser Asn Ser Gly
219         290                 295                 300
221     Gly Asn Tyr Asp Met Ala Lys Leu Leu Asn Gly Thr Val Val Gln Lys
222     305                 310                 315                 320
224     His Pro Met His Ala Val Thr Phe Val Asp Asn His Asp Ser Gln Pro
225                     325                 330                 335
227     Gly Glu Ser Leu Glu Ser Phe Val Gln Glu Trp Phe Lys Pro Leu Ala
228                 340                 345                 350
230     Tyr Ala Leu Ile Leu Thr Arg Glu Gln Gly Tyr Pro Ser Val Phe Tyr
231              355                 360                 365
233     Gly Asp Tyr Tyr Gly Ile Pro Thr His Ser Val Pro Ala Met Lys Ala
234         370                 375                 380
236     Lys Ile Asp Pro Ile Leu Glu Ala Arg Gln Asn Phe Ala Tyr Gly Thr
237     385                 390                 395                 400
239     Gln His Asp Tyr Phe Asp His His Asn Ile Ile Gly Trp Thr Arg Glu
240                     405                 410                 415
242     Gly Asn Thr Thr His Pro Asn Ser Gly Leu Ala Thr Ile Met Ser Asp
243                 420                 425                 430
245     Gly Pro Gly Gly Glu Lys Trp Met Tyr Val Gly Gln Asn Lys Ala Gly
246              435                 440                 445
248     Gln Val Trp His Asp Ile Thr Gly Asn Lys Pro Gly Thr Val Thr Ile
249         450                 455                 460
251     Asn Ala Asp Gly Trp Ala Asn Phe Ser Val Asn Gly Gly Ser Val Ser
252     465                 470                 475                 480
254     Ile Trp Val Lys Arg
255                     485
258 (2) INFORMATION FOR SEQ ID NO: 3:
260     (i) SEQUENCE CHARACTERISTICS:
261          (A) LENGTH: 514 amino acids
262          (B) TYPE: amino acid
263          (C) STRANDEDNESS: single
264          (D) TOPOLOGY: linear
266    (ii) MOLECULE TYPE: peptide
268    (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 3:
270     Ala Ala Pro Phe Asn Gly Thr Met Met Gln Tyr Phe Glu Trp Tyr Leu
271     1               5                   10                  15
273     Pro Asp Asp Gly Thr Leu Trp Thr Lys Val Ala Asn Glu Ala Asn Asn
274                 20                  25                  30
276     Leu Ser Ser Leu Gly Ile Thr Ala Leu Trp Leu Pro Pro Ala Tyr Lys
277              35                  40                  45
279     Gly Thr Ser Arg Ser Asp Val Gly Tyr Gly Val Tyr Asp Leu Tyr Asp
280         50                  55                  60
282     Leu Gly Glu Phe Asn Gln Lys Gly Ala Val Arg Thr Lys Tyr Gly Thr
283     65                  70                  75                  80
285     Lys Ala Gln Tyr Leu Gln Ala Ile Gln Ala Ala His Ala Ala Gly Met
286                     85                  90                  95
288     Gln Val Tyr Ala Asp Val Val Phe Asp His Lys Gly Gly Ala Asp Gly
```

RAW SEQUENCE LISTING DATE: 12/06/2001
PATENT APPLICATION: US/09/902,188A TIME: 11:36:38

Input Set : N:\Crf3\RULE60\09902188A.txt
Output Set: N:\CRF3\12062001\I902188A.raw

```
289                 100                 105                 110
291     Thr Glu Trp Val Asp Ala Val Glu Val Asn Pro Ser Asp Arg Asn Gln
292             115                 120                 125
294     Glu Ile Ser Gly Thr Tyr Gln Ile Gln Ala Trp Thr Lys Phe Asp Phe
295         130                 135                 140
297     Pro Gly Arg Gly Asn Thr Tyr Ser Ser Phe Lys Trp Arg Trp Tyr His
298     145                 150                 155                 160
300     Phe Asp Gly Val Asp Trp Asp Glu Ser Arg Lys Leu Ser Arg Ile Tyr
301                     165                 170                 175
303     Lys Phe Arg Gly Ile Gly Lys Ala Trp Asp Trp Glu Val Asp Thr Glu
304                 180                 185                 190
306     Asn Gly Asn Tyr Asp Tyr Leu Met Tyr Ala Asp Leu Asp Met Asp His
307             195                 200                 205
309     Pro Glu Val Val Thr Glu Leu Lys Ser Trp Gly Lys Trp Tyr Val Asn
310         210                 215                 220
312     Thr Thr Asn Ile Asp Gly Phe Arg Leu Asp Ala Val Lys His Ile Lys
313     225                 230                 235                 240
315     Phe Ser Phe Phe Pro Asp Trp Leu Ser Asp Val Arg Ser Gln Thr Gly
316                     245                 250                 255
318     Lys Pro Leu Phe Thr Val Gly Glu Tyr Trp Ser Tyr Asp Ile Asn Lys
319                 260                 265                 270
321     Leu His Asn Tyr Ile Met Lys Thr Asn Gly Thr Met Ser Leu Phe Asp
322             275                 280                 285
324     Ala Pro Leu His Asn Lys Phe Tyr Thr Ala Ser Lys Ser Gly Gly Thr
325         290                 295                 300
327     Phe Asp Met Arg Thr Leu Met Thr Asn Thr Leu Met Lys Asp Gln Pro
328     305                 310                 315                 320
330     Thr Leu Ala Val Thr Phe Val Asp Asn His Asp Thr Glu Pro Gly Gln
331                     325                 330                 335
333     Ala Leu Gln Ser Trp Val Asp Pro Trp Phe Lys Pro Leu Ala Tyr Ala
334                 340                 345                 350
336     Phe Ile Leu Thr Arg Gln Glu Gly Tyr Pro Cys Val Phe Tyr Gly Asp
337             355                 360                 365
339     Tyr Tyr Gly Ile Pro Gln Tyr Asn Ile Pro Ser Leu Lys Ser Lys Ile
340         370                 375                 380
342     Asp Pro Leu Leu Ile Ala Arg Arg Asp Tyr Ala Tyr Gly Thr Gln His
343     385                 390                 395                 400
345     Asp Tyr Leu Asp His Ser Asp Ile Ile Gly Trp Thr Arg Glu Gly Val
346                     405                 410                 415
348     Thr Glu Lys Pro Gly Ser Gly Leu Ala Ala Leu Ile Thr Asp Gly Pro
349                 420                 425                 430
351     Gly Gly Ser Lys Trp Met Tyr Val Gly Lys Gln His Ala Gly Lys Val
352             435                 440                 445
354     Phe Tyr Asp Leu Thr Gly Asn Arg Ser Asp Thr Val Thr Ile Asn Ser
355         450                 455                 460
357     Asp Gly Trp Gly Glu Phe Lys Val Asn Gly Gly Ser Val Ser Val Trp
358     465                 470                 475                 480
360     Val Pro Arg Lys Thr Thr Val Ser Thr Ile Ala Trp Ser Ile Thr Thr
361                     485                 490                 495
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VERIFICATION SUMMARY DATE: 12/06/2001
PATENT APPLICATION: US/09/902,188A TIME: 11:36:40

Input Set : N:\Crf3\RULE60\09902188A.txt
Output Set: N:\CRF3\12062001\I902188A.raw

L:28 M:220 C: Keyword misspelled or invalid format, [(A) APPLICATION NUMBER:]
L:29 M:220 C: Keyword misspelled or invalid format, [(B) FILING DATE:]